The Progressive Fish-Culturist 49:310–312, 1987

Improved Method of Measuring Lengths of Large Samples of Fish

LEE TRENT, BARBARA JAYNE PALKO, AND ANITA TRIMBLE

National Marine Fisheries Service
Southeast Fisheries Center
Panama City Laboratory
3500 Delwood Beach Road
Panama City, Florida 32407, USA

Abstract.—A new method to record fish lengths is described. Its advantages include quick recording of large numbers of fish by one person, accurate measurements by inexperienced personnel, easy transmission of data, low expense, usability under harsh field conditions, and easy transportability.

As part of an investigation of the population dynamics of king mackerel (*Scomberomorus cavalla*) and Spanish mackerel (*S. maculatus*) on the Atlantic coast of the southeastern USA and the Gulf of Mexico, we needed to collect accurate length data from numerous fish with the assistance of inexperienced volunteers. Although fish lengths are commonly measured on a measuring board, the nature of our data-collecting network required the use of an alternative procedure. In addition to the criteria for desirable fish-measuring devices listed by Williams (1960) and Armstrong (1976, 1981), an ideal length-measuring procedure for our study should (1) allow length data to be collected quickly by a single person, (2) allow untrained personnel to obtain accurate measurements, (3) provide easily transmitted data not subject to errors that can result from repeated data transcription, (4) be inexpensively constructed and operated, (5) be usable under various harsh field conditions, and (6) be easily portable.

Several methods of recording fish lengths on plastic by a punch or pencil mark (Buchanan-Wollaston 1928; Thompson 1929; Holt 1958) satisfied some of our criteria. This paper describes the design and use of a modification of these methods that proved successful for the collection of length data of king and Spanish mackerels by untrained volunteers.

Components of our length-measuring system include a board, similar to a conventional fish-measuring board (i.e., one with a flat surface and an upright headpiece), and a custom-fitted overlay.

The board assembly (Figure 1) has suitable dimensions for measuring fish up to 137 cm long and is made with an aluminum headpiece, a pine board, and a piece of rubber mat. The board assembly weighs about 2.3 kg. Stainless steel studs are located precisely to hold the overlays in the proper position. The mat is secured on one end by the bolted aluminum headpiece and on the other end by staples. The mat prevents the board from becoming rough and worn as a result of continual hole punching.

The waterproof paper overlay (Figure 2) is precisely cut to fit the board and held in position by the holes that fit over the studs; this limits variation in length measurements to less than 2 mm of true length. The sheet records lengths when a hole is punched at the point of measurement with a round cylindrical punch having a blunt-pointed end (Figure 1).

The punch sheet can be designed to suit individual needs; the sheet we used in the mackerel survey (Figure 2) defines and records up to nine samples (nine rows) on a single sheet. The num-

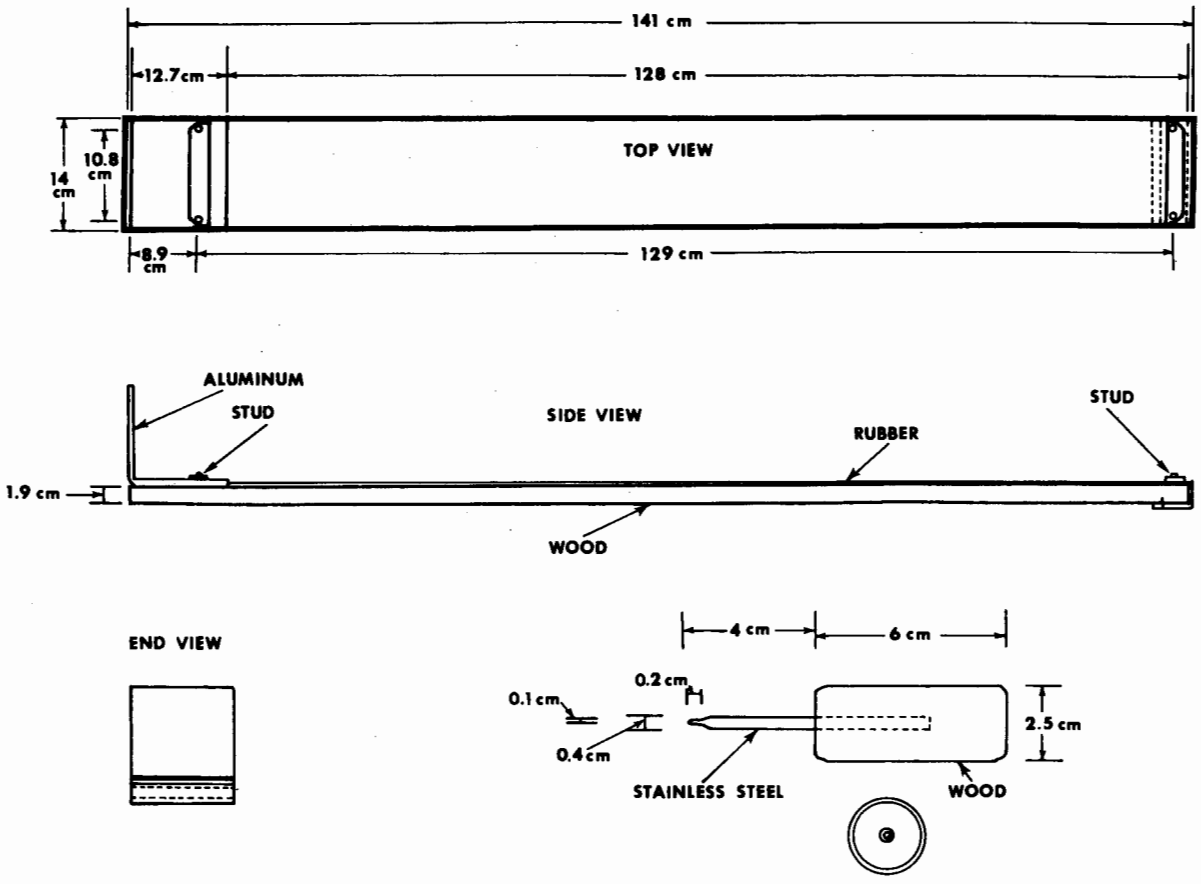

FIGURE 1.—Design and dimensions of the measuring board and punch.

bers 1–9 are repeated along the sheet to identify sample number quickly along the entire length. Sample characters (e.g., area, subarea) are recorded on either end of the sheet with a soft-lead pencil. A sample is defined as one or more fish with all of the same sample characters except sex. Lengths are recorded by punching a hole at the appropriate location in the paper after the fish is laid out flat. When a punch-sheet is completed, it is removed, washed with soap and water, and air-dried. The holes per length interval (e.g., 196–205 mm, 206–215 mm) in a sample are counted and recorded within the space on the sheet with a fine-point waterproof ink pen. Holes that fall on vertical lines separating centimeter intervals are counted in the lower interval. The sheet is easily mailed.

With this method, we obtained data over broad geographic areas without personally training the samplers. The system has been used successfully by boat captains, fish house workers, fishermen, and students, all of whom were given written instructions to obtain length data and to report these data weekly. The punch sheet serves as the storage and transfer device for the original data. Punch sheets have distinct advantages over conventional methods of measuring lengths. The sheets create length-frequency data when the holes are counted and the numbers are recorded on the sheets. A large savings in time results from fewer numbers to store and proof, especially as sample size increases. The method of mailing data at specified intervals has proven effective in quality control of data collection during the sampling period and in the short turn-around of data to user groups.

The only drawbacks of our method are slightly higher costs and the danger of duplicating measurements by punching the same hole twice. The total cost of making a board similar to the one shown in Figure 1 was about $15; the cost of printing 1,000 overlay sheets as described in Figure 2 was about $1,000. This results in a cost per sample, beyond the initial investment of the board, of US $0.11–$1.00, depending on the number of

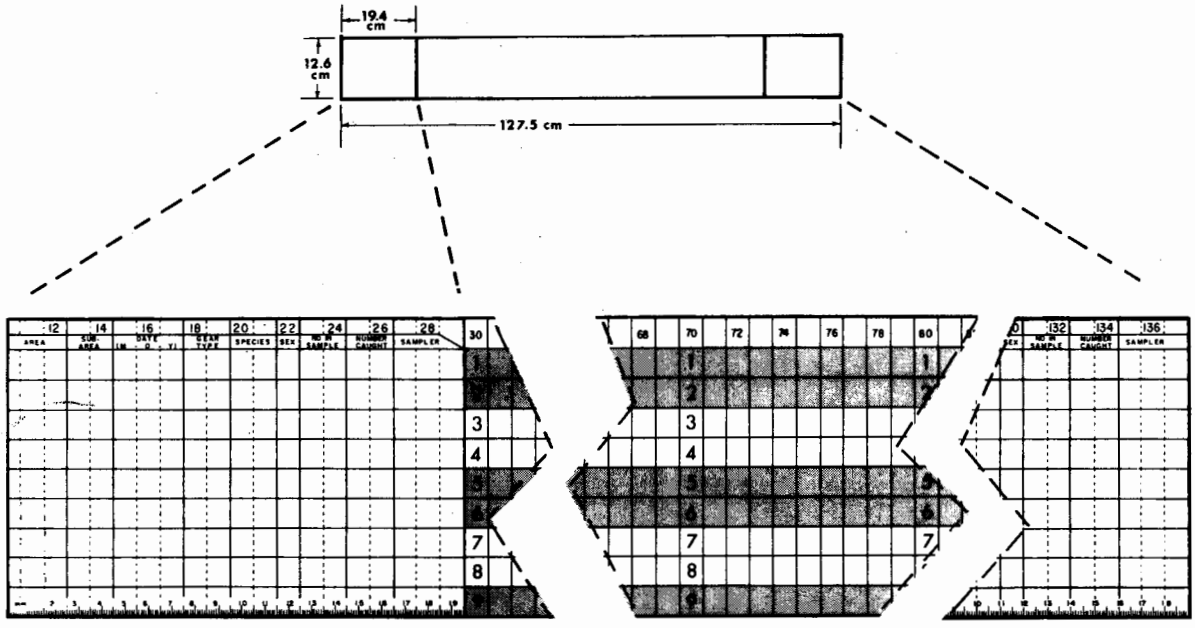

FIGURE 2.—Preprinted punch sheet illustrating sample character headings and a section of recording area.

samples recorded per sheet, provided that at least 1,000 data sheets are obtained.

References

Armstrong, D. W. 1976. Development of a semi-automatic fish measuring board. International Council for the Exploration of the Sea, C.M. 1976/F:37, Copenhagen.

Armstrong, D. W. 1981. Further development of a semi-automatic fish measuring board. International Council for the Exploration of the Sea, C.M. 1981/G:45, Copenhagen.

Buchanan-Wollaston, H. J. 1928. New apparatus for measuring fish. Journal du Conseil, Conseil International pour l'Exploration de la Mer 3:380–381.

Holt, S. J. 1958. International training center on the methodology and techniques of research on mackerel (*Rastrelliger*). ETAP (Expanded Technical Assistance Program) FAO (Food and Agriculture Organization of the United Nations) Reports 1095, Rome.

Thompson, D. W. 1929. Apparatus for measuring fish. Journal du Conseil, Conseil International pour l'Exploration de la Mer 4:103.

Williams, T. 1960. "One-man" measuring board. Indo-Pacific Fisheries Council Occasional Paper 60/3.